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## The Tetranychidae of Mexico (Acarina)

BY

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**ABSTRACT.** Mites of the family Tetranychidae known to occur in Mexico are included in this report. Twenty-five species distributed in seven genera are included, among which are ten previously named species reported for the first time from Mexico and eight species new to science. The eight new species are assigned to genera as follows: *Aplonobia*, two new species; *Neotetranychus*, four new species; *Eotetranychus*, one new species; *Oligonychus*, one new species.

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Portions of this study were made possible through grants from the Greater University Fund, University of Kansas, which provided funds to finance surveys in Mexico during 1955 and 1956. The report on this project has been divided into sections, the first section, here presented, being restricted to mites of the family Tetranychidae.

It is undoubtedly true that the additional records of known species of tetranychid mites plus the new species described from collections made in Mexico in connection with this study represent a very small increment of the total number of species of mites in this family that occur in Mexico. The acarine fauna of Mexico has been virtually ignored by most collectors, or if not ignored then collections have been retired to some inaccessible recess where they will remain until renewed interest in this group of arthropods develops. It is hoped that this paper will contribute in a small way to the arousal of this interest in Mexican tetranychid mites and will stimulate field workers in Mexico to collect more assiduously the mites of this and other acarine families. It will be efforts of this sort that will ultimately provide the types of fundamental informa-

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tion necessary for the solution of complex problems in speciation, distribution and the like that will result in a better understanding of the relationships existing in the world fauna within the order Acarina. The importance of tetranychid mites to agriculture increases the urgency for discovering these relationships, for it is probably true that many forms as yet undescribed pose serious threats to areas of intensified and specialized crop production.

#### FAMILY TETRANYCHIDAE Donnadieu

The family Tetranychidae can be readily recognized by having the basal segments of the chelicerae fused to form a mandibular plate or stylophore. The stylophore therefore embraces the two recurved bases of the movable styletlike chelicerae which are long and slender appendages adapted for piercing. The fourth segment of the palpus bears a prominent claw situated dorsally at the distal end of the segment. The palpal tarsus, displaced to a ventral position by the tibial claw, provides a chelate arrangement of these terminal elements of the appendage often referred to as the "thumb-claw" process. There are not more than sixteen pairs of dorsal body setae. Tarsus I usually has two pairs of duplex setae and tarsus II bears a single pair.

Immediately following is a key to the genera of the family Tetranychidae now definitely known to be represented by species in Mexico. Since excellent keys are now available in the comprehensive work of Pritchard and Baker (1955), the present authors feel that this simplification of the key, which excludes several genera that may subsequently be collected in Mexico, is justifiable.

#### KEY TO GENERA KNOWN TO OCCUR IN MEXICO

1. Empodium bearing tenent hairs; duplex setae at extreme end of tarsus; female with three pairs of anal setae, male with five pairs of anal setae ..... 2  
     Empodium lacking tenent hairs; female with two pairs of anal setae, male with four pairs ..... 3
2. Four pairs of dorsal propodosomal setae present; true claws long and well developed ..... *Bryobia*  
     Three pairs of dorsal propodosomal setae present; true claws absent, *Aplonobia*
3. Tarsus I empodium rudimentary; less than two pairs of duplex setae present ..... *Eutetranychus*  
     Tarsus I empodium well developed; two pairs of duplex setae present . . . 4
4. Two pairs of para-anal setae present; peritreme usually ends in a simple bulb ..... 5  
     One pair of para-anal setae present; peritreme usually ends in a chambered hook ..... 6

5. Empodium divided on distal two thirds into three pairs of hairs, except leg I and II of male ..... *Eotetranychus*  
 Empodium not divided on at least the proximal one half, ..... *Neotetranychus*
6. Empodium with distal end divided into three pairs of hairs, *Tetranychus*  
 Distal end of empodium clawlike not divided, empodial claw subtended proximoventrally by numerous hairs ..... *Oligonychus*

#### Genus BRYOBIA Koch

The genus *Bryobia* is distinctive in possessing four pairs of dorsal propodosomal setae. The true claws are well developed with lateral tenent hairs and they are usually retrorse on the distal end. The peritreme usually ends in an elongated chamber or an anastomosing enlargement.

#### *Bryobia bakeri* (McGregor)

The type specimens of this species were collected from Mt. Popocatepetl near Mexico (City) at 12,000 feet elevation from the trunk of a pine tree. A single female was collected in Texas by R. K. Fletcher on wheat.

#### *Bryobia praetiosa* Koch

Reported records of *Bryobia praetiosa* indicate that it is widely distributed throughout the world. The following collections are from Mexico: 9 miles east of Huezotzingo, Puebla, June 27, 1955, R. E. Beer and D. S. Lang, under rocks; 6 miles south of Avila Camacho, Puebla, June 29, 1955, R. E. Beer and D. S. Lang, under rocks; 7 miles northwest of León, Guanajuato, August 19, 1954, W. T. Atyeo, under rocks.

#### Genus APLONOBIA Womersley

The genus *Aplonobia* has the true claws reduced to slender pads bearing a pair of tenent hairs distally and the empodium consists of a slender pad with ventrally directed tenent hairs. There are only three pairs of dorsal propodosomal setae present. The termination of the peritreme is variable. The inner sacral setae are in line with the dorsocentral setae and resemble a fourth pair of dorsocentrals.

#### *Aplonobia verrucosa* sp. nov.

(Figs. 2, 3, 4, 5)

*Female*: Terminal seussillum of palpus longer than claw, slender, spinelike; dorsal fusiform setae slender, half as long as sensillum. Stylophore about as long as broad, emarginate on posterior border, striations longitudinal; peritreme strongly elbowed, ending in enlarged branched leaflike chamber. Tarsus I with three ventral tactile setae proximal to duplex setae, proximal member of duplex setae

minute; tibia I with four tactile and three sensory setae. Tarsus II with three ventral tactile setae proximal to duplex setae; tibia II with four tactile and two sensory setae. First and fourth pairs of legs longer than legs II and III, legs of uniform thickness to end of tarsus, abruptly angled at union of empodium; empodium on slender pedicel. First pair of dorsal propodosomal setae half as long as other setae, slightly petiolate, plumose; remainder of dorsal setae uniformly tapering to point, much longer than interval separating them, set on strong tubercles. Humeral setae absent. Integumentary striae transverse on propodosoma, longitudinal in areas of hysterosomal and sacral setae. Body thrown into numerous folds. Length of body  $420\mu$ , including rostrum  $505\mu$ ; greatest width of body  $340\mu$ .

*Male*: Similar to female. First pair of legs longer than other legs. Aedeagus long, gently undulating, leveling slightly dorsad, broadest at base, distal end abruptly tapering to rounded tip. Length of body  $412\mu$ , including rostrum  $500\mu$ .

In life the females are green with yellowish legs and males are yellow with legs pink or orange near their apices. Although quite abundant on the host plants in the area, they were scattered on both surfaces of the leaves indicating an absence of the gregarious habit. Webbing was absent. Mites were present in equal numbers on old and new foliage. No eggs were seen though they were probably abundant but concealed beneath the dense pubescence of the under leaf surfaces. Several males were assembled around most of the molting, quiescent females.

*Holotype*: Male, 10 miles south of Chila, Oaxaca, Mexico, July 6, 1956, R. E. Beer, on *Lippia graveolens*.

*Allotype*: Female, same data as holotype.

*Paratypes*: Several males and females with same data as holotype.

*Location of types*: Holotype, allotype and several paratypes of both sexes in the Snow Entomological Museum, University of Kansas. Four males and four females (paratypes) deposited in the United States National Museum.

*Aplonobia dyschima* sp. nov.

(Figs. 3, 6)

*Female*: Terminal sensillum of palpus thin, setalike. Stylophore with longitudinal striae; peritremes protruding anteriorly, elbowed, enlarged anastomosing chambers at distal ends. Duplex setae on tarsus I adjacent, proximal member short, less than one fourth as long as distal member; four plumose tactile setae on dorsal surface,

eight tactile and one sensory setae on ventral surface proximal to duplex setae; tibia I with six plumose tactile setae and one simple sensory seta on dorsal surface. Five plumose tactile setae on ventral surface. Tarsus II with proximal member of duplex setae plumose, one third as long as distal member, four plumose tactile setae and three sensory setae proximal to duplex setae; tibia II with seven plumose tactile setae. Empodium of all legs longer than pad of true claw. First pair of dorsal propodosomal setae lanceolate, longer than other dorsal setae which are spatulate. Striations fine, transverse; surface of body thrown into folds. Length of body 495 $\mu$ , including rostrum 555 $\mu$ ; greatest width 410 $\mu$ .

*Male:* Unknown.

*Holotype:* Female, General Terán, Nuevo León, Mexico, July 19, 1954, W. T. Atyeo, on *Acacia* sp.

*Paratypes:* Several females, same data as holotype.

*Location of types:* Holotype and several paratypes in Snow Entomological Museum, University of Kansas. Two paratypes deposited in the United States National Museum.

*Aplonobia dyschima* resembles *Monoceronychus corynetes* in having subspatulate dorsal setae and in the general body shape but can be separated by the length of the front legs. *M. corynetes* has the front pair of legs one and one-half times as long as the body while the legs of the first pair of *A. dyschima* are approximately as long as the body. Further separation is by the duplex setae on tarsus I, *A. dyschima* has the proximal member plumose and one-third as long as the distal member.

Pritchard and Baker (1955) state that *M. corynetes* is intermediate between *Aplonobia* and *Monoceronychus* due to the round body and in lacking a propodosomal projection, but these authors in a recent consultation have indicated that a transferral of *M. corynetes* to the genus *Aplonobia* is forthcoming in a future publication. *Aplonobia* is similar to *M. corynetes* in the position of the inner sacral setae, general body shape and in the degree of the propodosomal modification. However, because of the submedian position of the inner sacrals, the absence of an anterior dorsal projection of the propodosoma and the presence of a single rather than two dorsal shields serve to separate both *M. corynetes* and *A. dyschima* from the typical *Monoceronychus*. In Pritchard and Baker's key *A. dyschima* will run to *A. myops* but differs from this species in dorsal setation and other characters. The future discovery of additional species of *Aplonobia* and *Monoceronychus* may provide a better understanding and delineation of the genera.

GENUS *EUTETRANYCHUS* Banks

The genus *Eutetranychus* can be recognized by lacking the two pairs of duplex setae on tarsus I and II. A single pair of associated setae, resembling duplex setae, is often present. The empodium is greatly reduced and appears absent and the true claws are reduced to short pads with a pair of distally directed tenent hairs.

*Eutetranychus banksi* (McGregor)

This mite is apparently widely distributed, being reported from North, Central and South America, Europe, Africa and Asia. Its host associations are numerous with no significant plant relationships indicated. The following collections from Mexico are here recorded: El Salto Falls, San Luis Potosí, Mexico (*Citrus* sp.); 6 miles west of Teziutlán, Puebla, Mexico (orange); 16 miles north of Juchitan, Oaxaca, Mexico (*Vatairea Lundellii*). In life, females are brownish and males reddish-brown. They inhabit the upper surfaces of the leaves. No webbing is produced.

GENUS *NEOTETRANYCHUS* Trägårdh

The genus *Neotetranychus* is distinctive in having the single empodial claw well developed and undivided on at least the proximal half. There are two pairs of para-anal setae present and the peritreme usually ends in a simple bulb.

As an aid to the identification of the known species of the genus, a complete key to species of *Neotetranychus* follows. This key includes several species not now known to occur in Mexico.

KEY TO THE SPECIES OF *NEOTETRANYCHUS*

- |                                                                                                                 |                      |
|-----------------------------------------------------------------------------------------------------------------|----------------------|
| 1. Body with dorsal setae longer than longitudinal interval separating adjacent setae .....                     | 2                    |
| Body with dorsal setae shorter than longitudinal interval separating adjacent setae .....                       | 5                    |
| 2. Dorsal setae set on tubercles .....                                                                          | 3                    |
| Dorsal setae not set on tubercles .....                                                                         | 4                    |
| 3. Tibia II with seven tactile setae (Europe) .....                                                             | <i>rubi</i>          |
| Tibia II with six tactile setae .....                                                                           | <i>siccus</i>        |
| 4. Empodium with three pairs of hairs at distal end .....                                                       | <i>undulatus</i>     |
| Empodium simply clawlike .....                                                                                  | <i>hamus</i>         |
| 5. Empodium with three pairs of hairs at distal end .....                                                       | <i>virginiensis</i>  |
| Empodium simply clawlike .....                                                                                  | 6                    |
| 6. Dorsocentral hysterosomal setae slender, shorter than the longitudinal interval between adjacent setae ..... | <i>hakea</i>         |
| Dorsocentral hysterosomal setae not slender .....                                                               | 7                    |
| 7. Dorsal setae leaflike .....                                                                                  | <i>flabellosetus</i> |
| Dorsal setae oblong spatulate .....                                                                             | <i>hispidosetus</i>  |

*Neotetranychus hispidosetus* sp. nov.

(Figs. 1, 3, 4)

*Female*: Terminal sensillum of palpus two and one-half times as long as broad; fusiform setae slender, longer than sensillum. Stylophore about as broad as long, strongly emarginate on posterior border, striations longitudinal; peritreme straight distally ending in simple bulb. First and third pairs of dorsal propodosomal setae longer than interval separating adjacent setae, second pair much shorter, broader and rounder at tip; inner sacral setae small, spatulate, outer sacral setae twice as long, swollen at tip. Integumentary striae beadlike, irregular, longitudinal in area of dorsal propodosomal setae, transverse in area of dorsocentral hysterosomal setae, transverse in area of sacral setae. Tarsus I with duplex setae adjacent, proximal member small, four tactile and three sensory setae proximal to duplex setae; tibia I with seven tactile and two sensory setae. Tarsus II with two tactile and one sensory seta proximal to duplex setae; tibia II with four tactile and two sensory setae. Length of body 480 $\mu$ , including rostrum 560 $\mu$ ; greatest width 316 $\mu$ .

*Male*: Similar to female. Terminal sensillum of palpus minute; dorsal fusiform setae slender, long. Sacral setae all similar in length and shape. Leg I approximately as long as body; tarsus I with four tactile and three sensory setae proximal to duplex setae; tibia I with nine tactile and two sensory setae. Tibia II with five tactile setae. Aedeagus gently curves dorsad, ending in compact enlargement, ventral angles approximately equal. Length of body 390 $\mu$ , including rostrum 430 $\mu$ .

*Holotype*: Male, 17 miles north of Tehuiztingo, Puebla, Mexico, July 17, 1955, R. E. Beer and D. S. Lang on *Erythrina* sp.

*Allotype*: Female, same data as holotype.

*Paratypes*: Several males and females with same data as holotype.

*Location of types*: Holotype, allotype and several paratypes of both sexes located in the Snow Entomological Museum, University of Kansas. Five males and one female (paratypes) deposited in the United States National Museum.

This species is pale yellow and slightly speckled with brown in life. The types were collected from a very large population of mites that was present in equal numbers on both surfaces of the leaves of the host plant (coral tree). Eggs were pale yellow and spheroid, webbing sparse. Damage to the host plant was severe.

*Neotetranychus hamus* sp. nov.

(Figs. 1, 4)

*Female*: Terminal sensillum of palpus large, three times as long as broad; dorsal fusiform setae slender, oblong. Stylophore one and one-half times as long as broad, strongly emarginate on posterior border; peritreme straight distally ending in simple bulb. Leg I slightly longer than other legs; tarsus I with four tactile setae proximal to duplex setae, proximal member of duplex setae half as long as distal member; tibia I with eight tactile and two sensory setae. Tarsus II with proximal member of duplex setae half as long as distal member; tibia II with six tactile setae. Empodium of all legs similar. Dorsal setae of body petiolate, pubescent, slightly expanded near base, tapering to point, about as long as longitudinal interval separating them. Integumentary striae transverse. Length of body  $300\mu$ , including rostrum  $370\mu$ ; greatest width of body  $228\mu$ .

*Male*: Similar to female. Terminal sensillum of palpus minute, dorsal fusiform setae long, slender. Tarsus I with three tactile and two sensory setae proximal to duplex setae; proximal member of duplex setae half as long as distal member; tibia I with seven tactile and two sensory setae. Tibia II with six tactile setae. Aedeagus bends dorsad, corniform, one and one-half times as long as broad, tapering abruptly from base to pointed apex. Length of body  $290\mu$ , including rostrum  $340\mu$ .

*Holotype*: Male, 5 miles north of Tepic, Nayarit, Mexico, July 26, 1956, R. E. Beer.

*Allotype*: Female, same data as holotype.

*Paratypes*: Several males and females with same data as holotype.

*Location of types*: Holotype, allotype and several paratypes of both sexes deposited in the Snow Entomological Museum, University of Kansas. Two males and two females (paratypes) deposited in the United States National Museum.

This species differs from *N. siccus* in length of members of duplex setae, dorsal setation not being set on tubercles, and terminal sensillum of palpus being broad. Aedeagus is most similar to *N. rubi* but is not as slender nor as pointed and large; not sickle-shaped as in *N. rubi*.

In life this mite is elongate and greenish-yellow in color. Eggs are pale yellowish and spheroid. Webbing was not apparent in live colonies. The identity of the host plant is not known but field notes indicate that it was a woody shrub or tree with trifoliolate leaves (Leguminosae?). Damage to the host was moderately severe.



*Neotetranychus flabellosetus* sp. nov.

(Figs. 1, 3, 4)

*Female*: Terminal sensillum of palpus two and one-half times as long as broad, uniform diameter on proximal two thirds, tapers to angulate tip on distal one third. Stylophore twice as long as broad, emarginate on posterior border, broadly rounded on anterior margin; peritreme ends in a simple bulb. Tarsus I with duplex setae adjacent, proximal member of duplex setae small, less than one-fourth as long as distal member, five tactile setae proximal to duplex setae; tibia I with seven tactile and two sensory setae. Tarsus II with proximal member of duplex setae one-third as long as distal member, three tactile and one sensory setae proximal to duplex setae; tibia II with six tactile setae. Empodium of all legs simply clawlike. First pair of dorsal propodosomal setae over twice as long as other propodosomal setae, clunal setae similar to first pair of propodosomal setae, remaining dorsal setae short, spatulate, plumose. Integumentary striae transverse except for longitudinal striae in area of sacral setae. Length of body  $450\mu$ , including rostrum  $505\mu$ ; greatest width of body  $324\mu$ .

*Male*: Similar to female. Tarsus I with six tactile setae proximal to duplex setae; tibia I with seven tactile and four sensory setae. Aedeagus broad at base, curving slightly dorsad, terminating on distal end in an angulated enlargement, dorsal and ventral angulations approximately equal. Length of body  $300\mu$ , including rostrum  $380\mu$ .

*Holotype*: Male, 16 miles north of Juchitan, Oaxaca, Mexico, July 13, 1955, R. E. Beer and D. S. Lang, on *Cassia bacillaris*.

*Allotype*: Female, same data as holotype.

*Paratype*: One female, same data as holotype.

*Location of types*: Holotype, allotype and paratype in the Snow Entomological Museum, University of Kansas.

The male of *Neotetranychus flabellosetus* resembles *N. virginienensis* and *N. hispidosetus* in the appearance of the aedeagus, *N. virginienensis* can be recognized by having the empodium divided into three pairs of hairs. *N. hispidosetus* can be separated from *N. flabellosetus* by the dorsal setation, *N. flabellosetus* has short, spatulate setae on the dorsum while *N. hispidosetus* has oblong, spatulate setae.

*Neotetranychus undulatus* sp. nov.

(Figs. 1, 4)

*Female*: Terminal sensillum of palpus two and one-half times as long as broad; dorsal fusiform setae broad, ovate. Stylophore broadly rounded, approximately two times as long as broad, emar-

ginate on posterior margin, with longitudinal striations. Peritreme straight proximally, bent distally to form an elongated chamber. Tarsus I with five tactile setae proximal to duplex setae, proximal member of duplex setae small, one-fourth as long as distal member; tibia I with seven tactile and two sensory setae. Tarsus II with proximal member of duplex setae one-fourth as long as distal member, three tactile and one sensory setae proximal to duplex setae; tibia II with six tactile setae. Dorsal setae of body slender, about as long as longitudinal interval separating them. Integumentary striae transverse except for longitudinal striations in area of sacral setae. Length of body  $560\mu$ , including rostrum  $600\mu$ ; greatest width of body  $380\mu$ .

*Male:* Similar to female. Integumentary striae transverse. Tarsus I with proximal member of duplex setae one-half as long as distal member, three tactile setae and two sensory setae proximal to duplex setae; tibia I with nine tactile and two sensory setae. Tibia II with seven tactile and two sensory setae. Aedeagus long and slender, strongly undulate, tapering to rounded tip. Length of body  $420\mu$ , including rostrum  $540\mu$ .

*Holotype:* Male, two miles west of Antiguo Morelos, Tamaulipas, Mexico, August 3, 1955, R. E. Beer and D. S. Lang, on *Beaucarnea stricta*.

*Allotype:* Female same data as holotype.

*Paratypes:* Two females, same data as holotype.

*Location of types:* Holotype, allotype and one paratype in the Snow Entomological Museum, University of Kansas. One paratype deposited in the United States National Museum.

In life, mites of this species are pale yellow in color. They assemble in small colonies on the under sides of the slender leaves of the host plant. Eggs are pale yellow and spheroid and webbing is sparse. (Author's note: A large collection taken in the type locality in 1956 was lost in transit.)

#### GENUS *EOTETRANYCHUS* Oudemans

The genus *Eotetranychus* possesses two pairs of para-anal setae. The duplex setae on tarsus I are adjacent and the legs tend to terminate abruptly. The empodium consists of three pairs of distally directed hairs and the peritreme usually ends in a simple bulb.

*Eotetranychus oistus* sp. nov.

(Figs. 2, 4)

*Female*: Terminal sensillum of palpus twice as long as broad, dorsal fusiform setae slender, about as long as terminal sensillum. Stylophore one and one-half times as long as broad, emarginate on posterior border, abruptly rounded on anterior border; peritreme straight distally ending in simple bulb. Tarsus I with four tactile setae proximal to duplex setae, proximal member of duplex setae one-fourth as long as distal member; tibia I with six tactile and four sensory setae. Tarsus II with four tactile setae proximal to duplex setae; tibia II with eight tactile setae. Dorsal body setae gently tapering to a point, longer than interval separating adjacent setae; dorsal striations transverse. Length of body  $390\mu$  including rostrum  $450\mu$ ; greatest width of body  $250\mu$ .

*Male*: Similar to female. Terminal sensillum of palpus minute, appearing absent. Tarsus I with four tactile and two sensory setae proximal to duplex setae. Tarsus II with three tactile and one short sensory setae proximal to duplex setae. All legs short and stubby. Aedeagus small, twice as long as broad, dorsal surface with indentation, tapering abruptly to a point, ventral surface uniformly tapering to tip. Length of body  $300\mu$ , including rostrum  $380\mu$ .

*Holotype*: Male, Atlixco, Puebla, Mexico, July 19, 1955, R. E. Beer and D. S. Lang, on *Ipomoea arborescens*.

*Allotype*: Female, same data as holotype.

*Paratypes*: Several males and females with same data as holotype.

*Location of types*: Holotype, allotype and several paratypes of both sexes located in the Snow Entomological Museum, University of Kansas. Two males and one female (paratypes) in the United States National Museum.

*Eotetranychus oistus* belongs to the Tiliarum Group of Pritchard and Baker. It resembles *E. malvestris* but can be separated easily by differences in the aedeagi. Tight colonies were present along the mid-vein of the leaf on the under surface. The mites were yellow in life, eggs spheroid and webbing sparse. Damage to the leaves of the host plant was severe.

*Eotetranychus deflexus* (McGregor)

This species has heretofore been reported only from California and Oregon with the only recorded host, snowberry (Oregon). The following collections are now recorded: 19 miles north of Huachi-

nango, Puebla, Mexico (blackberry); 12 miles west of Huachinango, Hidalgo, Mexico (*Quercus crassifolia*). Mites are yellowish in life and form dense colonies on the under surfaces of the leaves of the host plant. Webbing is dense, eggs pale and spheroid. Damage to blackberry was severe but only negligible on *Quercus*.

*Eotetranychus carpini* (Oudemans)

Pritchard and Baker have indicated subspeciation in this species as an answer to variability in certain morphological characters that is correlated with distribution. According to their proposed groupings, the following collections based upon the morphological distinctions they suggest, are recorded for *E. carpini carpini*: México (city), D. F. Mexico, (cottonwood and sycamore); 19 miles north of Huachinango, Puebla, Mexico (alder); 4 miles south of Teziutlán, Puebla, Mexico (alder). The subspecies *carpini* has heretofore been regarded as restricted to the Old World, with *borealis* occurring in western North America. This Mexican record for *carpini* therefore represents a significant distribution record, in extending *carpini* into the Western Hemisphere. Mites from the above Mexican collections were in each case inflicting serious damage upon the host plants. Colonies are formed on the under sides of leaves. Eggs are pale and spheroid and webbing abundant. Live mites are yellow in color. Previous host records from Canada, Europe and the United States indicate a restriction to deciduous trees, shrubs and brambles which is compatible with observations on the Mexican collections here recorded.

*Eotetranychus steganus* Pritchard and Baker

This species has previously been known from a single area, Florida, and its host associations restricted to a single plant group, palmetto. A second collection is here recorded as follows: El Salto Falls, San Luis Potosí, Mexico (*Sabal mexicana*).

*Eotetranychus ecclisis* Pritchard and Baker

This species is known from a single host species, *Artemisia mexicana*, and at the present time the known distribution is restricted to the type collection data as follows: Mexico (city)—Cuernavaca Highway, kilometer 67, January 22, 1941, E. W. Baker.

*Eotetranychus perplexus* (McGregor)

This species is recorded from California and Idaho on *Cercocarpus*, from California on *Salix*, from Washington on *Prunus emarginatus*, and from British Columbia, California and Washington on *Purshia*. The following distribution and host record is added at

this time: 17 miles north of Tehuitzingo, Puebla, Mexico, July 18, 1955, R. E. Beer and D. S. Lang, on *Cryptocarpa procera*. In life these mites were small and yellowish. They assembled in small, tight colonies on the lower surfaces of the leaves. Eggs were pale yellowish and webbing abundant.

In the Mexican collection the male aedeagus deviates slightly from the configuration ordinarily associated with the species, in being bent more strongly ventrad just before its apex. However, this difference is not considered to represent more than that which would be expected in comparing specimens varying in appearance because of orientation on the slide.

#### Genus OLIGONYCHUS Berlese

The genus *Oligonychus* has the empodium divided into several hairs proximoventrally and hooklike on the distal end. A single pair of para-anal setae is present and the dorsal setae are not set on tubercles.

#### *Oligonychus flexuosus* sp. nov.

(Figs. 2, 3, 4)

*Male*: Terminal sensillum of palpus pronounced, more than twice as long as broad; dorsal fusiform setae nearly as long as sensillum. Stylophore broadly rounded anteriorly, slightly emarginate posteriorly, with longitudinal striae. Peritreme straight distally, ending in a simple bulb. Tibia I with nine tactile and one sensory setae; tarsus I with four tactile setae proximal to duplex setae; duplex setae widely spaced, proximal member short; empodium I split to form two stout curved claws. Tibia II with five tactile setae; tarsus II with four tactile setae proximal to duplex setae; tibia II with seven tactile setae. Dorsum of body with slender tapering setae, longer than the interval separating adjacent setae; dorsal striae transverse in area of histerosomals, longitudinal posterior to sacral setae. Four pairs of genitoanal setae present. Aedeagus broad at basal fifth, abruptly tapering to a uniformly slender shaft which curves dorsad; distal fifth broadly curving posteriorly. Length of body 305 $\mu$ , including rostrum 334 $\mu$ .

*Female*: Similar to male. Terminal sensillum of palpus shorter and broader than male, dorsal fusiform setae slightly longer than sensillum. Empodium I divided to form two claws, three pairs of empodial hairs below the empodial claws. Two pairs of anal setae present. Length of body 362 $\mu$ , including rostrum 411 $\mu$ ; greatest width of body 234 $\mu$ .

*Holotype*: Male, 10 miles south of Chiapa, Chiapas, Mexico, July 12, 1955, R. E. Beer and D. S. Lang, on wild grass (*Paspalum humboldianum*).

*Allotype*: Female, same data as holotype.

*Paratypes*: Several males and females of both sexes, same data as holotype.

*Location of types*: Holotype, allotype and several paratypes in the Snow Entomological Museum, University of Kansas. Two males and two females deposited in the United States National Museum.

*Oligonychus flexuosus* belongs to the Pratensis Group of Pritchard and Baker. Members of this group can be recognized by empodium I of the male which is split into two claws, aedeagus bending dorsad, tibia I bearing nine tactile setae and tarsus I bearing four tactile setae. The peritreme ends in a simple bulb. The females of this group cannot be differentiated as to separate species. The male of *O. flexuosus* is readily recognized by the extremely long, slender aedeagus. Other members of the group have the distal end of the aedeagus sigmoid or with a compact enlargement, while the end of the aedeagus in *O. flexuosus* is simple. The aedeagus of *O. mcgregori* resembles *O. flexuosus* in having a slender prolongation but differs in having a strong barb at the base. In addition these species can be separated by the peritremes, *O. mcgregori* having a retrorse peritreme. Empodium I of *O. mcgregori* consists of three pairs of empodial hairs below the slender empodial claw, while *O. flexuosus* has empodium I divided into two claws.

In life both sexes were yellowish. The colonies were in tight clusters on the lower surface of the leaves. The leaves showed a yellow to brown discoloration in clearly defined patches embracing the area occupied by the colony. The eggs were pale and spheroid without a central stipe.

#### *Oligonychus aceris* (Shimer)

This species has been recorded from Indiana, Kansas, New Jersey, New York, North Carolina, Washington, and District of Columbia in the United States, with all recorded collections from maple. To this distribution and host record is added the following: El Salto Falls, San Luis Potosí, Mexico, August 1, 1955, R. E. Beer and D. S. Lang, on sycamore. Observations of the mites at the time the Mexican collections were made revealed that they assembled in small colonies on the upper surface of the leaf. Feeding caused a russet discoloration on the infested area. Adult mites were reddish-

brown with reddish shoulders and capitulum and pinkish legs. Eggs were pale yellow, circular in outline, flattened and had a central stipe. Webbing was present but not profuse.

*Oligonychus propetes* Pritchard and Baker

All previously recorded collections of this species were taken from oak in the eastern United States at the following locations: North Carolina, Virginia, District of Columbia. A collection from Mexico is here added to the known distribution records and may be identified by the following data: 6 miles north of Jacala, Hidalgo, Mexico, July 30, 1955, R. E. Beer and D. S. Lang, on *Quercus* sp. In life small colonies of the yellow mites were present on the under sides of the pubescent leaves and caused a yellowish discoloration of the dark, glossy, green upper surfaces of the leaves. Eggs were pale yellow.

*Oligonychus stickneyi* (McGregor)

Specimens of this species are recorded from Arizona, California, and Florida in the United States and from Morelos in Mexico. The U. S. collections were taken from various species of grass and from corn and maize. The Mexican collection was taken on maize. The following collection is here added to the Mexican distribution record: México (city), D. F. Mexico, June 22, 1956, R. E. Beer, on grass.

*Oligonychus mcgregori* (Baker and Pritchard)

This species has been known previously only by the type specimens which were taken from cotton at Chinandega, Nicaragua. It is here recorded for the first time from Mexico, this collection identified with the following data: 16 miles north of Juchitan, Oaxaca, Mexico, July 3, 1955, R. E. Beer and D. S. Lang, on *Vatairea Lundellii*. In life the mites are yellowish with brown spots, the dorsum is flattened. They cluster on the upper surfaces of the glossy leaves of the host plant along the mid-vein. Eggs are yellowish, circular in outline and flattened. Webbing is sparse. The mites were quite abundant and damage to the host conspicuous.

*Oligonychus viridis* (Banks)

This species is recorded from pecan in Florida, Georgia and Louisiana. Collections here reported from Mexico would indicate that it is generally distributed throughout the length of this country. The following localities and host records are added to the published information on *O. viridis*: El Salto Falls, San Luis Potosí, Mexico (avocado); México (city), D. F. Mexico, and Teziutlan,

Puebla, Mexico (camellia); 4 miles west of San Cristóbal de las Casas, Chiapas, Mexico (*Chimaphyla maculata*). Adult females in life are maroon or brownish with pale legs. They assemble in small, tight colonies with moderate webbing on both leaf surfaces. Damage to the host is a russet discoloration of the green leaves.

#### Genus TETRANYCHUS Dufour

The genus *Tetranychus* can be recognized by the single pair of para-anal setae and by having the duplex setae separated on tarsus I. The legs tend to taper to the empodium which is composed of three pairs of hairs. The peritreme usually ends in a chambered hook.

#### *Tetranychus mexicanus* (McGregor)

This species has been collected on citrus in the following localities: Laredo, Texas, Quarantine station, host (orange) shipment originating in Mexico; Monte Alto, Texas (lemon); Valles, San Luis Potosí, Mexico; Concordia, Argentina. To these distribution and host records may be added the following: 20 miles south of Acayucan, Veracruz, Mexico (wild banana); Tecolutla, Veracruz, Mexico (coconut palm). The following information concerning the Acayucan collection from banana was recorded in field notes: In life, female mites are robust and maroon in color with pink legs and gnathosoma; males are orange. Eggs are pale yellow and spheroid, webbing profuse, and dense colonies occur on the under sides of the leaves. The mites were exceedingly abundant and damage to the host severe. As regards the Tecolutla collection field notes indicate that in life, female mites are robust and red in color.

#### *Tetranychus pacificus* (McGregor)

This species is known from California, Idaho and Oregon where it has been reported from a multitude of hosts including several deciduous trees and shrubs, herbaceous annuals, melons and the like. To this distribution and host list may be added the following: 10 miles north of Matias Romero, Oaxaca, Mexico (*Asarum* sp.); El Salto Falls, San Luis Potosí, Mexico (*Bacconia frutescens*). In both of the Mexican collections, living mites were scattered on the leaves of the host plants and populations small. It would seem that the scarcity of individuals would mask a true gregarious habit if such were the case with this species.



*Tetranychus telarius* (Linnaeus)

The following locality and hosts are added to the exceedingly long lists of similar information for this species: Mexico (city), D. F. Mexico, (*Fraxinus* sp. and *Convolvulus* sp.). Damage to each of these hosts, ash planted as street trees and wild *Convolvulus* weeds was very severe. In the *Fraxinus* collections the live mites were the typical yellowish color phase. In the *Convolvulus* collections the living mites were maroon in color.

*Tetranychus dugesii* Cano and Alcacio

As suggested by Pritchard and Baker (1955) this species is at present under questionable assignment to the genus *Tetranychus*. Type material is identified with the following information, though the location of the type specimens is not known: Hacienda Escuela, México, on *Medicago denticulata*. This is the only known reference to this species.

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The authors owe a debt of gratitude to several botanists who gave generously of their time and energy to assist with host identifications. We wish to express our thanks to Eizi Matuda and Faustino Miranda of the Instituto Biologico in México (city) and to W. H. Horr of the University of Kansas.

## REFERENCES CITED

PRITCHARD, A. EARL, and BAKER, EDWARD W.

1955. A Revision of the Spider Mite Family Tetranychidae. Pacific Coast Entomological Society, Memoirs Series, vol. 2, 472 pp., 1955.

## FIGURE 1

Figures in left column are female tibia and tarsus I. Figures in right column are female tibia and tarsus II. All magnifications are identical.

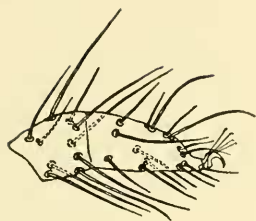
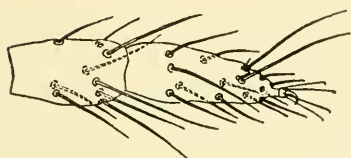
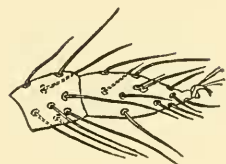
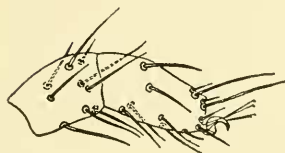
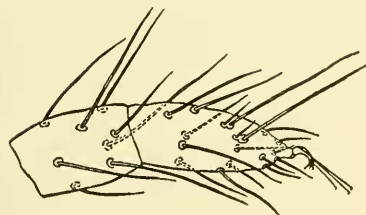
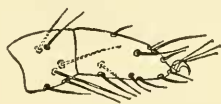
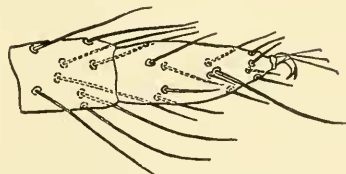
*Neotetranychus hamus* sp. nov.

*N. hispidosetus* sp. nov.

*N. flabellosetus* sp. nov.

*N. undulatus* sp. nov.

FIGURE 1

*N. homus**N. hispidosetus**N. flabellosetus**N. undulatus*

## FIGURE 2

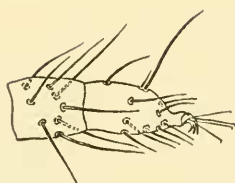
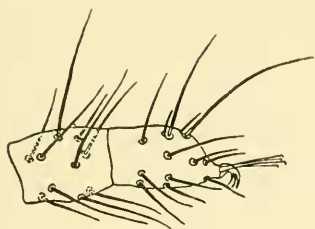
Figures in left column are female tibia and tarsus I. Figures in right column are female tibia and tarsus II. All magnifications are identical.

*Eotetranychus oistus* sp. nov.

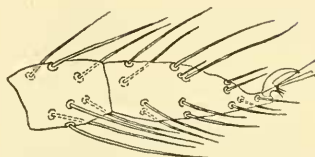
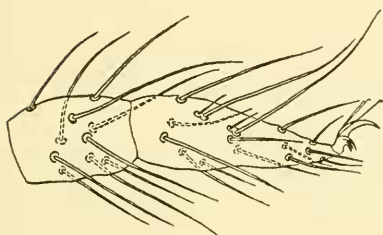
*Oligonychus flexuosus* sp. nov.

*Aplonobia verrucosa* sp. nov.

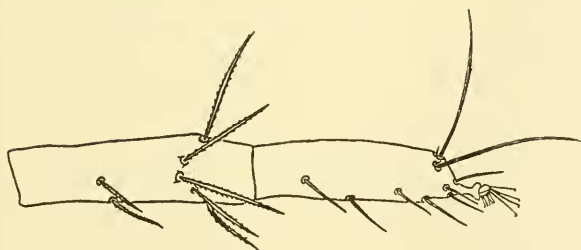
FIGURE 2



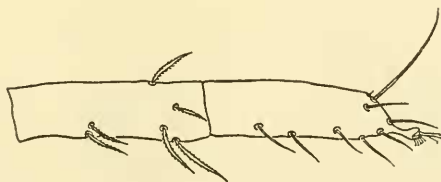
*E. oistus*



*O. flexuosus*



*A. verrucosa*



## FIGURE 3

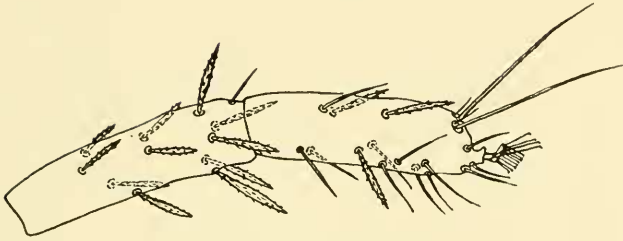
Tibia and tarsus I and II, *Aplonobia dyschima* sp. nov. Pretarsus of leg I of male, *Oligonychus flexuosus* sp. nov. Palpus of *Aplonobia verrucosa* sp. nov. Typical dorsocentral setae (identical magnification) of:

*Neotetranychus hispidosetus* sp. nov.

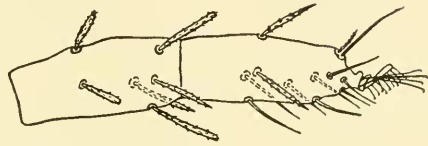
*N. flabellosetus* sp. nov.

*Aplonobia dyschima* sp. nov.

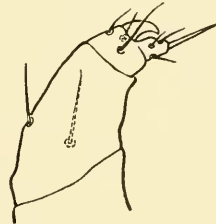
FIGURE 3



*A. dyschima*



*O. flexuosus*



*A. verrucosa*



*N. hispidosetus*



*N. flabellosetus*



*A. dyschima*

## FIGURE 4

Aedeagi of males (identical magnification):

*Neotetranychus hamus* sp. nov.

*N. flabellosetus* sp. nov.

*N. hispidosetus* sp. nov.

*N. undulatus* sp. nov.

*Eotetranychus oistus* sp. nov.

*Oligonychus flexuosus* sp. nov.

*Aplonobia verrucosa* sp. nov.



FIGURE 4



*N. hamus*



*N. flabellosetus*



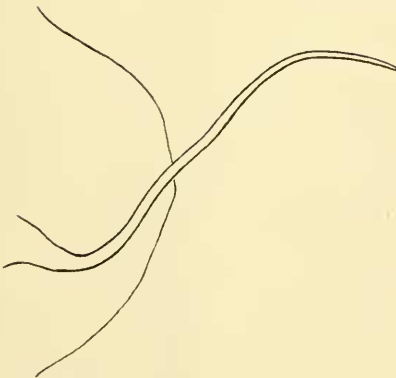
*N. hispidosetus*



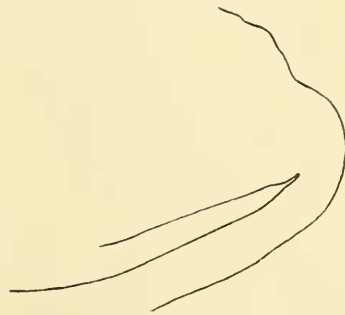
*N. undulatus*



*E. oistus*



*O. flexuosus*

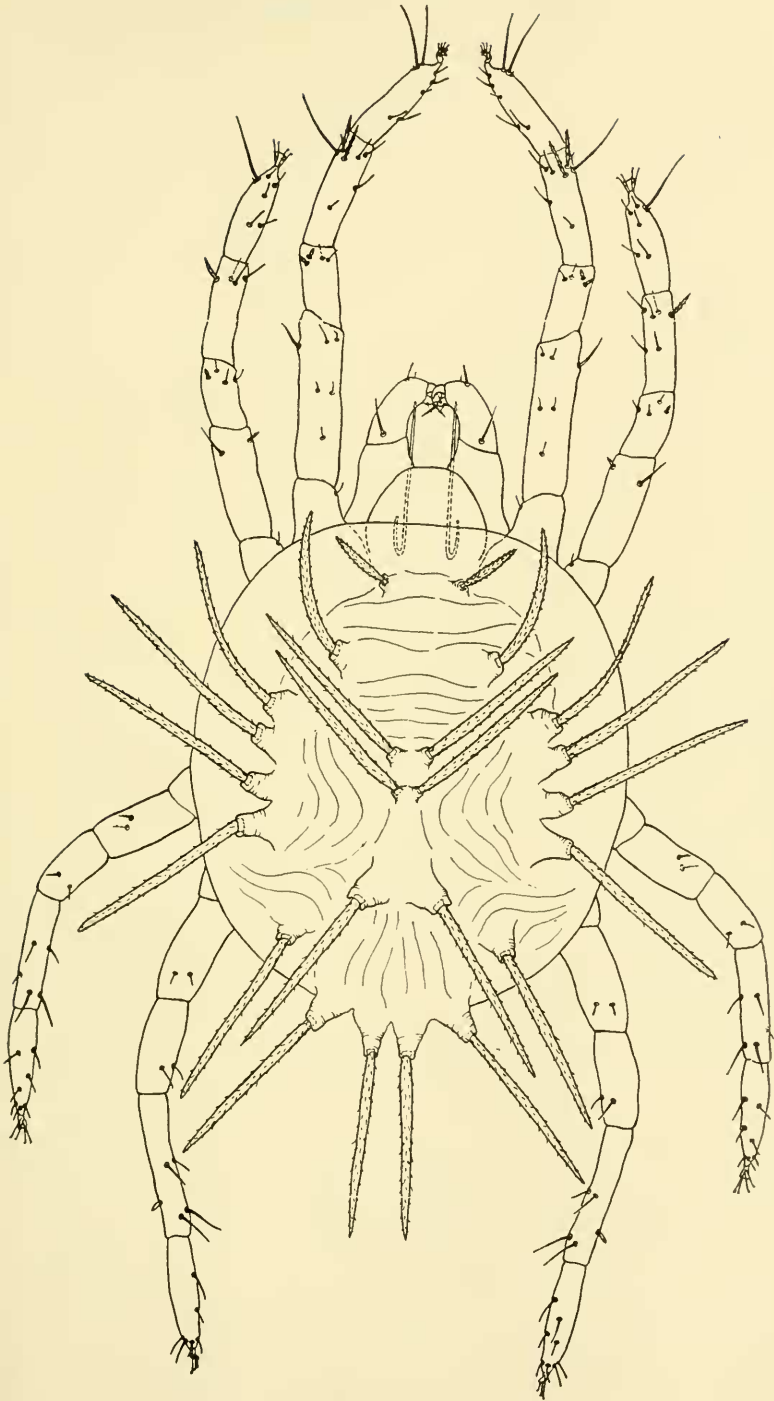


*A. verrucosa*

## FIGURE 5

Adult female, *Aplonobia verrucosa* sp. nov. (dorsal aspect).

FIGURE 5

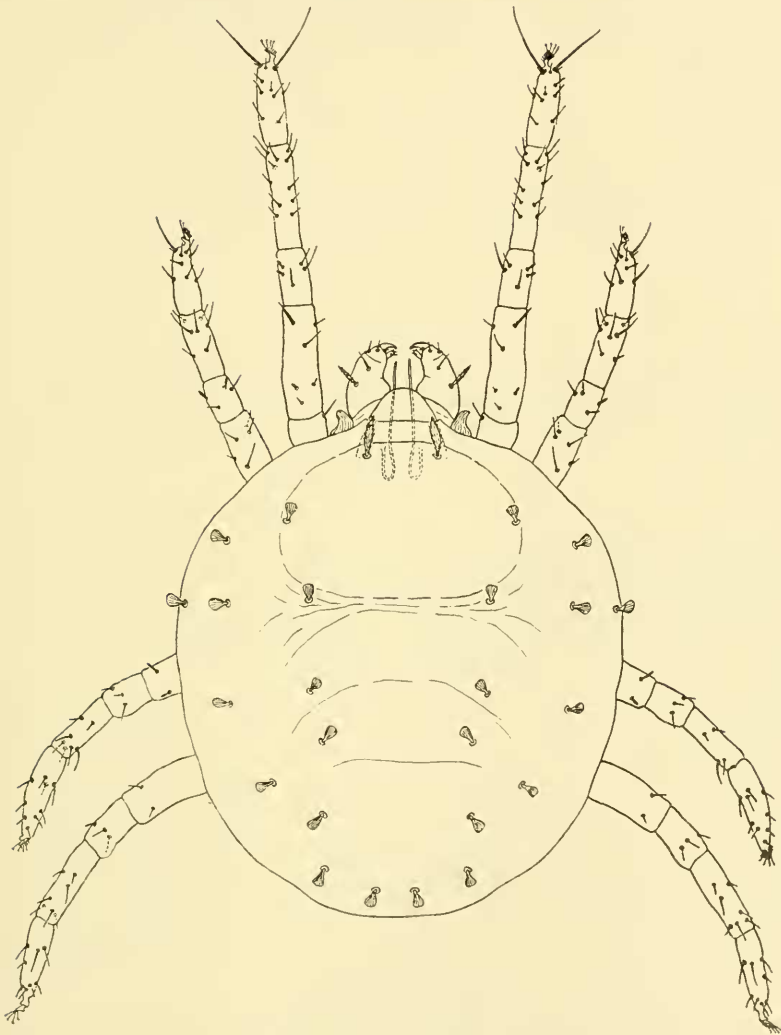


*Apionobia verrucosa*

**FIGURE 6**

Adult female, *Aplonobia dyschima* sp. nov. (dorsal aspect).

FIGURE 6



*Aplonobia dyschimo*